The Future of Health Sciences Education

An academic and technical approach to student success in Indiana's Health Industry

A white paper
April 22, 2005

Introduction

This paper is about planning for the future of Health Sciences Education in Indiana. In the future health sciences education will be the delivery of both academic and technical learning to a broad segment of secondary students to prepare them for future education and careers after their secondary education is complete. Through the planning and execution work that this document illustrates, more Indiana students will achieve at a higher level in their academic courses while attaining a higher-level career exploration and technical learning. Through the execution of this plan, all students part of a health science pathway will be more readily prepared for a post-secondary education, some students completing a large portion of their post-secondary credits while still in high school and perform better in post-secondary fields of health sciences than students not completing a health science pathway plan of study. Students choosing not to go to college will leave high school with more than just a diploma, attaining certifications in various health related fields. As pointed out, this paper is not about simply academic education or career and technical education, but develops career clusters, pathways, standards, curriculum and assessments for instruction in both academic and technical learning, blending the two together in many cases. This paper cites numerous resources including the Indiana Health Industry Forum's Workforce Gap Analysis (www.ihif.org) and the work of the American Youth Policy Forum, (www.aypf.org) which worked diligently in creating a vision for career and technical education in the future.

This paper will:

- Provide a brief summary of the health industry in Indiana
- Provide a strong case for the delivery of health sciences education in a blended academic and technical format
- Provide a vision for the future of health sciences education
- Lay out the steps to be taken to accomplish the vision of health sciences education
- Develop timelines for the strategies to accomplish the vision

Current State of the Indiana Health Industry

The following is taken from the workforce gap analysis conducted by Thomas B. Miller and Associates in 2000 for the Indiana Health Industry Forum.

The health industries are major Indiana employers. In 2000, they accounted for one in ten Indiana jobs and generated $11 billion in wages. They employed over 277,000 people. These numbers should grow substantially, since the health industries in Indiana are projected to provide 40,000-45,000 job openings (new jobs and replacements) between 2003 and 2008. An estimated 28,000 of those job openings will be in the critical occupations identified in this report. This concentration of workers in the health industries gives Indiana a competitive advantage.

The health industries serve as an engine of economic growth for Indiana by creating high-paying jobs. Average pay in the health services was $33,197 in 2000; in medical manufacturing it was $78,909. Both exceeded the "family wage" standard of $30,000 per year for an average family, and the average state wage of $31,015. One reason for high average pay in these industries is that the critical occupations are those that require workers with high levels of technical or clinical skills, but not necessarily advanced (i.e.post-baccalaureate) degrees. Medical manufacturing is one of the state's leading advanced manufacturing sectors because of its technologically sophisticated and highly competitive nature.

For critical occupations requiring at least a two-year degree, there often is a mismatch between the number of workers who graduate from Indiana's colleges and universities and the workforce demands of employers. The shortages are especially acute in healthcare delivery professions. All of the registered nurses receiving an associate's or bachelor's degree in 2002 would not fill all of the open positions in Indiana hospitals alone—leaving aside demand from clinics, long-term care facilities and other medical organizations. Further, the number of new licenses issued to registered nurses has declined 20% since 1998. In other critical occupations, notably radiologic technology, nuclear medicine technology, respiratory therapy and medical sonography, Indiana's higher education pipeline produces too few healthcare technicians to meet demand (though some workers are trained for these occupations by other organizations.

In medical manufacturing, the number of workers available is less an issue. Medical manufacturers, however, face other challenges. For example, they need engineers in a variety of specializations. Although Indiana's colleges and

universities produced over 1,000 engineers in industry-critical fields in 2002, many left Indiana and the remaining labor pool did not meet the demand from medical manufacturers.

Another challenge is that medical manufacturers value workers' experience at least as highly as their educational credentials (although hiring practices are moving toward requirements for more post-secondary education). Major employers are reluctant to turn very expensive capital equipment over to inexperienced hands. Employers report, however, that workers leave Indiana's colleges, universities, and other training organizations without enough experiential learning.
Employers in both health industries often cited effective education and training programs at Indiana institutions. The programs cited, however, are not distributed evenly around the state, nor are they always located where employers are concentrated. Given that workforces tend to be regional, having a program located near the sources of demand is essential. To provide the workforce that the health industries need, institutional priorities and resource allocation decisions among Indiana's education providers must be aligned with the specialized and customized training demanded by employers.

Colleges and universities should:
• Collaborate with IHIF in industry-wide efforts to respond to evolving human capital needs
• Assist in getting the right programs in the right place at the right time
• Design programs around current workers and experiential learning
• Assist K-12 in strengthening math and science curricula

K-12 schools should:
• Collaborate with IHIF in industry-wide efforts to increase the math and science achievements of students, and with industry employers to address readiness issues for graduates entering the workforce
• Promote inclusive view of health industry careers

Based upon IHIF's workforce gap analysis report, the needs of the workforce have continued to evolve and require higher levels of academic, technical, and employability skills; therefore, Health Sciences education should be reviewed to ensure that it is meeting the needs of the labor market.

Future Themes

The following themes will be the base for the work of developing a comprehensive health science effort in secondary education in the state of Indiana:

- High School Reform
- Seamless Education
- Business Partnerships
- Access for All Students
- Monitoring and Measuring

High School Reform

Current high school reform efforts share some common themes – themes that an investment strategy in health sciences education can easily support and contribute to. Common strategies to improve learning for high school-aged learners rely on:

- Using more personalized and student-focused learning opportunities,
- Rigorous, integrated curriculum,
- Supports for all students, including guidance and college and career exploration,
- Making learning relevant by linking it to careers or other themes (like the arts),
- Providing various learning methodologies to meet multiple learning styles,
- Providing choices and options for teens based on their interests and using the community (employers) for learning, and
- Helping students plan for and advance from secondary to postsecondary education in a more thoughtful and planned manner

Programs that have these characteristics, whether they are career themes, service-learning, small learning communities, or the International Baccalaureate program, seem to be more successful than non-focused, general curriculum options. Health Sciences Education can be one strategy of a range of high quality learning options for high school-aged students in every community.

Health Sciences Education can be shaped to support high school reform efforts and focus on helping high school students improve academic performance to master standardized tests. While efforts must align with the No Child Left Behind Act and broader attempts to raise student achievement and improve high schools, the sole purpose of health sciences education should not be to reform high schools.

Seamless Education Efforts

Health Sciences Education can support efforts to increase connections between secondary and postsecondary education and increase the numbers of students pursuing postsecondary studies. By creating better defined and articulated pathways from high school to college and providing earlier and more comprehensive guidance and counseling, students can better plan for their future.

This seamless education will require a significant investment by the state to develop the infrastructure of the college/career pathways, such as alignment of high school exit exams with college entrance requirements and development of end of course exams for health science programs of study. And it will require planning and development with instructors from the various grade levels and from academic and occupational disciplines.

Attention and work also needs to be focused on developing or implementing models that allow dual enrollment, concurrent enrollment, dual credit or articulation agreements, or other strategies that help students advance more quickly through postsecondary education. Funding should be flexible enough to allow the creation or support of these arrangements that blend learning environments. Models, like early or middle college high schools with a career theme, or online learning or virtual schools, could be supported as well.

Programs of study should encourage students to pursue an associate's or bachelor's degree, but also recognize that some students will both work and go to college on a part-time basis for financial reasons.

Business Partnerships

Partnerships with employers and the community are needed to help provide information about careers and the workplace to students and their parents, and to serve as mentors or advisors and to help relieve the burden on school counselors. Counselors and teachers also should participate in externships with employers to learn more about the workplace, emerging careers, and the application of knowledge to workplace problems. Employers would play a key role in health science programs of study as a means of strengthening and ensuring the quality of programs. Employers, as partners, can provide opportunities for internships and work-based learning experiences for students and teachers, serve as mentors, provide input and guidance on curriculum and ensure that it meets industry standards, provide information on emerging technology and careers, and donate equipment and other material to high schools. Employer involvement needs to be continued as students move through the program of study to postsecondary education, where industry input into curriculum and standards becomes much more relevant.

For all Students

Seen as a desirable option in the high school or in the community, health science programs of study would be open to students of all abilities. Students would not be tracked or assigned to a health science program of study based on previous history, grades, or other arbitrary selection processes, but rather select a program of study based on their interests.

Monitoring and Measuring

Monitoring the effectiveness of the health sciences education system and disseminating best practices that increase the capacity and quality of health science programs, including activities such as:

- Identification of effective, research-based health science programs;
- Work-based learning experiences that are directly tied to classroom learning;
- Models of assisting employers in providing high quality work-based learning opportunities;

- Models integrating high academic standards and industry-valued standards;
- Competency-based applied learning techniques for use in instruction and curriculum development;
- National data collection; and Alignment of federal funding for CTE with other laws, such as No Child Left Behind, Individuals with Disabilities Education Act, Adult Education and Family Literacy Act, the Workforce Investment Act, the Higher Education Act, and Temporary Assistance for Needy Families in the areas of assessments, accountability, pathways for advancement, curriculum, and standards.

Vision of Work

Activities focused on health sciences education at the *high school* will include:

- Developing employer partnerships at the state, regional, or local levels, in connection with postsecondary education to support high quality career programs of study;
- Developing frameworks for career-themed pathways and courses of study in partnership with postsecondary education institutions and employers;
- Developing coherent state standards, demonstrating how health sciences education will support No Child Left Behind and improve student outcomes;
- Developing health sciences curriculum that is integrated with rigorous academics and part of a sequence of courses leading to postsecondary level work;
- Professional development to increase academic and technical content knowledge of teachers, to expand opportunities for educators to experience the workplace through internships, to help teachers teach contextually, and improve teaching effectiveness for special population students. These efforts should be carried out in coordination with teacher training programs under the Higher Education Act and No Child Left Behind
- Developing technical and end-of-course CTE assessments, which could be performance based, aligned with No Child Left Behind.
- Evaluation and oversight of programs; and alignment of accountability systems.

Planning Steps

Strategy

Develop employer partnerships at the state, in connection with postsecondary education to support high quality career programs of study.

Tactics

- Assemble Indiana Health Sciences Education consortium to identify key health clusters that will play an important role in the future of the health industry in Indiana. The consortium will consist of partners from secondary and postsecondary education including both 2 year and 4 year colleges, business and industry representatives from a broad spectrum of the health sciences sector, Indiana Department of Education, Indiana Department of Workforce Development and the Indiana Health Industry Forum.
  Timeline: July – September 2005
- Come to a consensus of the key 5-6 health science clusters to provide focus.
  Timeline: September 2005
- Develop a joint marketing piece of the 5-6 health science clusters describing the various career opportunities, level of education needed, skills required and average salary range of selected jobs. The Indiana Consortium on Health Sciences Education would endorse this marketing piece in order to appeal to a wide range of students.
  Timeline: October 2005
- Showcase the clusters on the Department of Education and Department of Workforce Development, Indiana Health Industry Forum, post-secondary websites and others.
  Timeline: October 2005

Strategy
Develop frameworks for career-themed pathways and courses of study in partnership with postsecondary education institutions and employers

Tactics

- Develop list of post-secondary courses related to health sciences so that future development of secondary and course standards would articulate more efficiently with post-secondary instruction
  Timeline: November 2005
- Develop a list of certifications available in health sciences so that by-products of various courses could lead to certification in various health professions for some students
  Timeline: November 2005
- Develop a laundry list of course titles delivered in an academic, technical or blended way that would encompass the identified career clusters and help students prepare for further education and careers within these clusters.
  Timeline: November – December 2005
- Develop course descriptions for the courses that would provide a blueprint of the standards development of the courses. Course descriptions would include the following:
  - Course Title
  - Course Vision and Goals
  - Intent of delivery system (determine if course is to be more academic or more technical in nature)
  - Determine the teaching qualifications of the course
  - Determine possible prerequisites or academic and technical base needed to enroll in the course
  - Determine possible post-secondary articulation opportunities and certifications that a student could obtain through master of the course

  Timeline: November - December 2005
- Share the career clusters and course descriptions with health science education stakeholders across the state for key input before proceeding with standards development
  Timeline: January 2006
- Post the course descriptions on the already developed website.
  Timeline: January 2006

Strategy
Develop coherent state standards for the courses developed, demonstrating how health sciences education will support No Child Left Behind and improve student academic and technical outcomes to prepare them for post-secondary education and careers

Tactics

- Assemble team of post-secondary and secondary teachers to develop standards for the courses in phases with the 9-10 grade courses developed in the beginning phases.
  Timeline: January – February 2006 (Phase I – 9th and 10th grade courses)
  Timeline: January – February 2007 (Phase I – 10th and 11th grade courses)
  Timeline: January – February 2008 (Phase I – 10th and 11th grade courses)
- Share standards with public to gain input and comment
  Timeline: February - April 2006 (Phase I – 9th and 10th grade courses)
  Timeline: February - April 2007 (Phase I – 10th and 11th grade courses)
  Timeline: February - April 2008 (Phase I – 10th and 11th grade courses)
- Revise established course titles to more accurately reflect the standards developed for the courses
  Timeline: April 2006 (Phase I – 9th and 10th grade courses)
  Timeline: April 2007 (Phase I – 10th and 11th grade courses)
  Timeline: April 2008 (Phase I – 10th and 11th grade courses)
- Send the standards and indicators to the State Board of Education and the Commission for Higher Education for course approval and possible core 40 and academic honors credit in areas of science or math where applicable.

Timeline: May 2006 (Phase I – 9th and 10th grade courses)
Timeline: May 2007 (Phase I – 10th and 11th grade courses)
Timeline: May 2008 (Phase I – 10th and 11th grade courses)

- Continue to update website as standards are developed and approved for the various courses
- Revise established course titles to more accurately reflect the standards developed for the courses
  Timeline: May 2006, 2007, 2008
- Pursue post-secondary articulation agreements with post-secondary and certifications for students based upon the established standards.
  Timeline: May 2006 (Phase I – 9th and 10th grade courses)
  Timeline: May 2007 (Phase I – 10th and 11th grade courses)
  Timeline: May 2008 (Phase I – 10th and 11th grade courses)

Strategy
Develop health sciences lesson plans, problem based scenarios and labs that are based upon established state standards and part of a sequence of courses leading to postsecondary level work

Tactics

- Recruit model science or health science teachers to work collaboratively with post-secondary faculty in writing lesson plans meeting the standards and indicators
  Timeline: January 2006 (Phase I – 9th and 10th grade courses)
  Timeline: January 2007 (Phase I – 10th and 11th grade courses)
  Timeline: January 2008 (Phase I – 10th and 11th grade courses)
- Assemble the lesson plan writing teams to provide professional development on the preferred lesson plan writing outlines and then write lesson plans
  Timeline: May – August 2006 (Phase I – 9th and 10th grade courses)
  Timeline: May – August 2006 (Phase I – 10th and 11th grade courses)
  Timeline: May – August 2006 (Phase I – 10th and 11th grade courses)
- After completion of lesson plans for the courses, the courses will be piloted in schools represented by the teachers on the lesson plan writing teams
  Timeline: September 2006 – May 2007 (Phase I – 9th and 10th grade courses)
  Timeline: September 2007 - May 2008 (Phase I – 10th and 11th grade courses)
  Timeline: September 2008 - May 2009 (Phase I – 10th and 11th grade courses)
- Evaluation of the lesson plans will be ongoing throughout the pilot year with refinements and comment submitted on an ongoing basis
  Timeline: Ongoing
- Pilot programs will also utilize local business and industry representatives from various segments for student internships, problem based learning opportunities and utilization of resources
  Timeline: Ongoing
- Lesson plans will be revised and placed on a CD-Rom for easy access by all teachers
  Timeline: August 2006 – May 2007 (Phase I – 9th and 10th grade courses)
  Timeline: August 2007 – May 2008 (Phase I – 10th and 11th grade courses)
  Timeline: August 2008 - May 2009 (Phase I – 10th and 11th grade courses)

Strategy
Professional development to increase academic and technical content knowledge of teachers, to expand opportunities for educators to experience the workplace through internships, to help teachers teach contextually, and improve teaching effectiveness for special population students. These efforts should be carried out in coordination with teacher training programs under the Higher Education Act and No Child Left Behind.

Tactics

- After the pilot year of the courses developed, professional development will occur prior to the complete course rollout
  Timeline: July 2007 (Phase I – 9th and 10th grade courses)
  Timeline: July 2008 (Phase I – 10th and 11th grade courses)

Timeline: July 2009 (Phase I – 10th and 11th grade courses)

- Professional development will be based upon Indiana's Professional Development Standards and by Professional Development standards based upon NCLB
  Timeline: Ongoing
- Pre- and post assessment of the teachers will occur to determine growth areas and evaluation of the professional development for future activities
  Timeline: Ongoing
- Ongoing meetings and professional development will occur through out the year for teaches via video-conference, virtual courses and seminars
  Timeline: Ongoing
- Teacher licensure outside area of expertise will be flexible so long as the teacher completes the required training of the courses. For instance, a science teacher could teach a "nuclear medicine" course, which might be out of their licensure area so long as they complete the training. Furthermore, a registered nurse could teach an Anatomy and Physiology course for science credit so long as they complete the required training and pass the assessment portion of the training.
  Timeline: Ongoing

Strategy

Develop technical and academic assessments, which could be performance based, aligned with No Child Left Behind. Assessments would include both pre and post assessments to measure student growth over the period of the course. The post assessment would also be the assessment utilized for dual credit with post-secondary education

Tactics

- Assemble team of post secondary and secondary teachers to prioritize the indicators for the statewide assessments
  Timeline: July 2007 (Phase I – 9th and 10th grade courses)
  Timeline: July 2008 (Phase I – 10th and 11th grade courses)
  Timeline: July 2009 (Phase I – 10th and 11th grade courses)
- Work with assessment organization to develop the assessment questions based upon the prioritization of the indicators
  Timeline: August - December 2007 (Phase I – 9th and 10th grade courses)
  Timeline: August - December 2008 (Phase I – 10th and 11th grade courses)
  Timeline: August - December 2009 (Phase I – 10th and 11th grade courses)
- Pilot the assessments with 5-6 schools that piloted the original curriculum and evaluate the assessments for accuracy and effectiveness
  Timeline: May 2008 (Phase I – 9th and 10th grade courses)
  Timeline: May 2009 (Phase I – 10th and 11th grade courses)
  Timeline: May 2010 (Phase I – 10th and 11th grade courses)
- Rollout the assessments of the courses to other schools
  Timeline: August 2008 (Phase I – 9th and 10th grade courses)
  Timeline: August 2009 (Phase I – 10th and 11th grade courses)
  Timeline: August 2010 (Phase I – 10th and 11th grade courses)
- Develop professional development workshops based around indicators that scored lower than the average on the state-wide assessments
  Timeline: Ongoing

Strategy

Evaluation and oversight of programs; and alignment of accountability systems.

Tactics

- Support local schools in strategic planning processes to help them implement the systems, curriculum and partnerships necessary to operate a successful health sciences pathway
  Timeline: Ongoing

- Develop localized self-evaluation document to assist local schools in creating standards and accountability standards for intervention of problems and future growth
  Timeline: Ongoing
- Develop grant programs based upon the self-evaluation to encourage local schools to evaluate their health science pathways
  Timeline: Ongoing

Summary

This vision for health sciences education, although a bold undertaking, will truly increase the relevance and rigor of academic and technical courses related to health sciences education. Through the execution of this plan, more students will achieve at a higher level in math and science while obtaining strong technical and problem solving skills critical to a post-secondary education and a career.

The execution of this vision will require a collaborative effort from a variety of stakeholders in education, government and business. While not all contributing at the same level, it would be desirable that the support from these stakeholders be at high levels as an investment in this project equates to a strong future for the health and life sciences industry in Indiana.

This work needs to done. It's critical to our schools and it's critical to our future!